Emergence of Plasmid-mediated *bla*CMY genes and multidrug resistance among *Escherichia coli* O157:H7: Results of NARMS Monitoring 2000-2001

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Background: The National Antimicrobial Resistance Monitoring System (NARMS) for Enteric Bacteria monitors antimicrobial susceptibility among human enteric pathogens. Recent trends include emergence of extended-spectrum cephalosporin resistance due to plasmid-encoded blaCMY genes in penta-resistant non-Typhi *Salmonella*. For the first time, isolates of *E. coli* O157:H7 exhibiting this phenotype were found in 2000. Analysis of blaCMY+ *E. coli* O157:H7 isolates obtained by NARMS during 2000-2001 is presented.

Methods: As NARMS participants, state and local public health labs submit every 5th *E. coli* O157:H7 they receive to the Centers for Disease Control and Prevention for antimicrobial susceptibility testing. Minimum inhibitory concentrations (MICs) were determined for 17 antimicrobials using partial range broth microdilution (Sensititre®).

Results: Six *E. coli* O157:H7 isolates exhibited resistance consistent with a *bla*CMY mechanism (ampicillin, amoxicillin/clavulanate, cephalothin, cefoxitin, ceftiofur). Sensititre® ceftriaxone MIC ranged from 4 to 16 mg/ml. Five of the isolates also exhibited chloramphenicol, streptomycin, sulfamethoxazole and tetracycline resistance. Transformation of *E. coli* DH10B indicated transferable resistance by large plasmids that exhibit restriction profiles similar to those seen in multidrug-resistant non-Typhi *Salmonella*. Isoelectric focusing of donors and transformants showed a ß-lactamase consistent with CMY (pI >= 8.4). Presence of *bla*CMY genes was confirmed by sequencing transformants. The virulence plasmid was detected by PCR of virulence genes in the five donors tested but was absent in the respective transformants.

Conclusions: To our knowledge, this is the first report of plasmid-mediated blaCMY genes in *E. coli* O157:H7. Presence of *bla*CMY genes in pentaresistant isolates is not surprising in light of emergence of *Salmonella* serotypes (Typhimurium and Newport) with similar traits. Further studies are indicated to determine risk factors and exposures central to the acquisition of *bla*CMY+ R plasmids by *E. coli* O157:H7.